

CLAIMS

What is claimed is:

1. A heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body comprising:
 - a thermo-electrical structure that induces heat to and/or dissipates generated heat away from a region of a semiconductor body; and
 - at least one layer of a conductive material in contact with the thermo-electrical structure for conducting heat flow.
2. A heat regulating device according to claim 1, the thermo-electrical structure is a trough within the body of the layer of the conductive material.
3. A heat regulating device according to claim 1, further comprising a plurality of the thermo-electrical structures connected to form a spreading assembly.
4. A heat regulating device according to claim 3, the spreading assembly is operatively connected to a heat sink.
5. A heat regulating device according to claim 1, the thermo-electrical structure is a conductive pathway for heat transfer.
6. A heat regulating device according to claim 1, the thermo-electrical structure has a structure selected from a group consisting of: maze-shaped structure, helix structure, and a spring structure.

7. A heat regulating device for regulating a heat flow of an integrated circuit comprising:

means for inducing heat into or dissipating heat away from a region of a semiconductor body of the integrated circuit; and

heat conducting means in contact with the means for inducing heat into or dissipating heat away from the region of the semiconductor body.

8. A heat regulation system for an integrated circuit semiconductor body comprising:

an integrated circuit with a semiconductor chip having hot spots generated therein;

a heat regulating device including:

a thermo-electrical structure for at least one of inducing heat into and dissipating generated heat away from a region of a semiconductor body;

at least one layer of a conductive material in contact with the thermo-electrical structure for conducting heat flow; and

a control unit in communication with the heat regulating device for controlling a heat transfer between the heat regulating device and the semiconductor body based on data gathered by the heat regulating device.

9. A heat regulating system according to claim 8, the heat regulating device is integrated with the semiconductor chip.

10. A heat regulating system according to claim 8, further comprising a heat sink operatively connected to the thermo-electrical structure.

11. A heat regulating system according to claim 8, further comprising a temperature sensor.

12. A heat regulating system according to claim 10, the control unit includes a processor that analyzes integrated circuit temperature data.

13. A heat regulating system according to claim 10, the processor being operatively connected to the temperature sensor.
14. A heat regulating system according to claim 12, the processor determines the existence of an unacceptable temperature for a region of the integrated circuit.
15. A method for regulating heat flow in an integrated system comprising:
providing an integrated circuit with a semiconductor chip having hot spots generated therein;
a heat regulating device including: a thermo-electrical structure for at least one of inducing heat into and dissipating generated heat away from a region of a semiconductor body; at least one layer of a conductive material in contact with the thermo-electrical structure for conducting heat flow;
a control unit in communication with the heat regulating device; and
controlling by the control unit an operation of the heat regulating device in response to data gathered by the thermo-electrical structure.
16. A method for regulating heat flow in an integrated circuit according to claim 15, further comprising, creating a temperature grid of the integrated circuit showing a respective temperature for each region of the integrated circuit.
17. A method for regulating heat flow in an integrated circuit according to claim 16, further comprising comparing the temperature of the region with an allowable temperature for the region.
18. A method for regulating heat flow in an integrated circuit according to claim 16, further comprising activating a thermo-electrical structure for dissipating heat from the region.
19. A system for regulating heat flow in an integrated circuit according to claim 16, further comprising inducing heat by a thermo-electrical structure in to the region.

20. A system for regulating heat flow in an integrated circuit comprising:
means for measuring temperature of an integrated circuit at a plurality of regions; and
means for inducing heat into and out of the plurality of regions.
21. A system that facilitates regulating heat flow into and/or out of an integrated circuit semiconductor body comprising:
a component that identifies regions of the integrated circuit that require heat management;
a controller that regulates a thermo-electrical structure that induces heat to and/or dissipates generated heat away from a region of a semiconductor body; and
at least one layer of a conductive material in contact with the thermo-electrical structure for conducting heat flow.
22. The system of claim 21, the system comprising an artificial intelligence component that infers which of the regions will require heat management.